The Cassini 2000 Solar Conjunction:
Ka-band and X-band Signal Propagation Through the Solar Corona

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During the Cassini spacecraft's superior solar conjunction period in May 2000, the spacecraft's Ka-band and X-band signals were tracked by the NASA Deep Space Network's facilities at Goldstone, California. This solar conjunction was the second in which Ka-band signals were received through the solar corona. The observed solar corona effects included increased thermal noise, spectral broadening, amplitude scintillation, and reduction of received signal-to-noise ratio. These observations were acquired shortly before the expected peak of the current solar cycle. For these measurements, the solar elongation angle varied from 0.6 deg to 3.1 deg. The measurements were consistent with solar models developed from theory and from earlier S-band and X-band solar conjunction observations of other spacecraft. There were also instances of solar transient events which were consistent with elevated solar activity as expected near the peak of an 11-year solar cycle.